

**The association between Attention Deficit Hyperactivity Disorder and
attachment in an adult community sample**

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Statement

I declare that this thesis is my own work and that, to the best of my knowledge and belief, it does not contain material from published sources without proper acknowledgement, nor does it contain material which has been accepted for the award of any other higher degree or graduate diploma in any university.

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Abstract

The current paper utilises a structural equation modelling (SEM) approach to examine the structure of attention deficit/hyperactivity disorder (ADHD) in adulthood and assess the relation of IA and HI ADHD symptom domains with anxious and avoidant attachment dimensions. The study compared the 2-factor model with a bi-factor model of ADHD. The sample size for the present study was 326 adults, comprising 237 females (72.7%) and 89 males (27.3%) with an age range of 18-73 years inclusive. Participants were 326 adults (72.7% male; n=237 and 27.3% female; n=89) ranging from 18 to 73 years old. A bi-factor model of ADHD exhibited the best fit compared to the 2-factor model, suggesting it may be a better structural model for the organisation of ADHD symptoms in adults. Results suggest ADHD appears to be comprised of a single factor that captures common variance in ADHD symptom domains, as well as two separate inattention and hyperactivity-impulsivity factors that capture unique variance. The ADHD general factor was additionally found to be significantly related to insecure attachment, specifically anxious attachment but not avoidant attachment.

The association between attachment and Attention-Deficit Hyperactivity Disorder in an adult community sample

This study seeks to examine the structure of Attention-Deficit Hyperactivity Disorder (ADHD), and the relationship between attachment and the specific hyperactivity-impulsivity and inattention dimensions in an adult community sample.

Attention-Deficit Hyperactivity Disorder is a diagnostic description for children presenting with significant problems relating to attention, impulsiveness and overactivity (Barkley, 1998). A body of evidence additionally suggests the disorder persists in into adult life, either in accordance with full diagnostic criteria or in partial remission (Faraone, et al., 2000; Faraone & Biederman, 2005; Kooij et al., 2005; Mannuzza, Klein, & Moulton, 2003). The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR, American Psychiatric Association, APA 2000) and the International Classification of Diseases (ICD-10; World Health Organisation, WHO, 2007) both contain hyperactivity disorders, with the diagnostic criteria for both systems centred on the core symptoms of inattentiveness, hyperactivity and impulsivity.

Whilst symptom clusters are manifest within the two diagnostic systems, the structural organisation of ADHD symptoms continues to be widely debated, with arguments presented in the literature for one, two and three factor models. Generally the 2-factor model with inattention and hyperactivity/impulsivity factors has received the most support, with evidence for the model largely derived from confirmatory factor analysis (CFA) studies in child and adolescent samples (e.g. Molina, Smith, & Pelham, 2001; Collett, Crowley, Gimpel, & Greenson, 2000, and Gomez, Burns, Walsh, & Moura, 2003) as well as college student populations (Smith & Johnson, 1998; DuPaul, et al., 2001).

A diagnosis of ADHD is chiefly based on the criteria prescribed by the DSM-IV-TR which specifies a total of eighteen ADHD symptoms, distinguishing between symptoms of inattention and hyperactivity-impulsivity (APA, 2000). Nine inattention (IA) and nine hyperactivity/impulsivity (HI) symptoms are listed, and three ADHD subtypes specified: predominantly inattentive type, predominantly hyperactive-impulsive type, and the combined type-where the criteria is met for both the inattention and the hyperactive/impulsivity domains.

The IA symptom group includes characteristics such as difficulty sustaining attention, not following instructions, being forgetful and easily distracted, whereas the HI symptom group includes characteristics such as restlessness, talking excessively and fidgeting (hyperactivity) as well as interrupting and impatience (impulsivity) (APA, 2000). With the transition from childhood into adulthood developmental changes in the expression of ADHD may occur, with reductions in overt hyperactivity but persistent problems in organization and attention commonly reported (Faraone et al., 2000). Nonetheless, symptom persistence into adulthood is generally accepted.

The delineation of IA and HI symptoms assumes separate factors underpin the specific IA and HI symptom groups, analogous to a 2-factor model. Figure 3 depicts the path diagram of this model which also includes a correlation between the IA and HI factors. In addition to support from CFA studies, external validity of the 2-factor model has also been evidenced through studies demonstrating separation of the IA and HI factors through differential correlations with various criterion variables. For example, IA has been shown to be generally more associated with internalising disorders and syndromes as well as executive dysfunction (Chhabildas, Pennington & Willcutt, 2001) and academic impairments in domains such as reading (Willcutt & Pennington, 2000) and mathematics (Raghubar, et al., 2009). In contrast HI has generally been shown to be more closely associated with externalising disorders and syndromes such as oppositional defiance disorder (Burns & Walsh, 2002) as well as risky decision making (Toplak et al., 2005).

It is generally accepted that ADHD symptoms wax and wane across development (Lahey, Pelham, Loney, Lee, & Willcut, 2005). Overt signs of hyperactivity/impulsivity decline with increasing age, while inattentiveness remains relatively unchanged (Biederman, Mick & Faraone, 2000). Whilst the specific, factorial components or symptom presentations may vary, Martel, von Eye and Nigg (2010) propose the latent general ADHD construct remains relatively stable across situations and time. There is however limited statistical support for the conceptualisation of ADHD in this manner, with the dominant 2-factor model, and the one and three factor models failing to account for a 'general' factor. It is therefore argued the 2-factor model fails to align with the DSM-IV structure or account for the overlap and stable nature of ADHD symptom domains, as well as their distinctiveness and variability (Martel et al.).

In a shift away from the traditional models, an alternative conceptualisation of ADHD symptoms via a bi-factor model has emerged. Martel, Roberts, Gremillion, von Eye and Nigg (2011) argue the bi-factor model accounts for inter-individual heterogeneity in ADHD symptom presentation, suggesting individuals can manifest with general and/or specific liabilities while carrying the same latent ADHD disorder. The model comprises a general factor and separate specific IA and HI factors and allows for individual ADHD symptoms to simultaneously load on a general ADHD factor along with specific IA and HI factors, as shown in Figure 2. In this model the covariance across the IA and HI symptoms is explained by the general factor, and unique variance within the respective symptom groups is explained by the specific IA and HI factors.

This bi-factor structural model has been tested and replicated in clinical and community samples of children and adolescents with ADHD (Dumenci, McConaghy, & Achenbach, 2004; Martel et al., 2010; Toplak et al., 2009; Toplak et al., 2012 and Normand, Flora, Toplak & Tannok, 2012) and in two adult populations (Martel et al., 2012; Gibbins, Toplak, Flora, Weiss, & Tannock, in press).

In their study of clinic-referred adolescents Toplak et al. (2009) reported support for the bi-factor model based on both parent and adolescent ratings of ADHD symptoms. The bi-factor model was found to have better fit compared with the 2-factor model, with the IA symptoms generally more closely associated with the general factor, while the HI symptoms were more closely associated with a HI specific factor. These findings were replicated in a further study which, based on parent and teacher report, similarly found support for the bi-factor model across a large developmental and multinational/multicultural sample of children and adolescents (Toplak et al., 2012). The model was robust and invariant in relation to age, however strong invariance was not obtained consistently across countries.

In their longitudinal study of a community sample of school children aged 6-9 years, Normand and colleagues (2012) similarly found support for the bi-factor model, concluding models with a general factor and two or three specific factors best accounted for teacher and parent reports of ADHD symptoms at two time points separated by a twelve month interval. In contrast to Toplak et al. (2009), Normand et al. found IA symptoms to be more closely associated with an IA specific factor, whereas HI symptoms were more associated with a general factor.

Martel et al. (2010) additionally examined different bi-factor model structures in a community sample of children with and without ADHD. In their study, the more traditional (orthogonal) bi-factor model, where the general and specific factors are uncorrelated, was found to have poor fit. Martel et al. however reported the bi-factor model which included correlations between the general factor and specific factors (non-orthogonal) to be superior to existing factor models. This model was supported for both parent and teacher ratings, but did not reveal any clear patterns of associations between the general and specific factors and the HI and IA symptom clusters.

External validation for this non-orthogonal bi-factor model has also been established through an examination of child problem behaviours, cognitive control, and personality traits whereby the specific inattention factor exhibited a unique pattern of associations, found to be related to depression/withdrawal, slower cognitive task performance, introversion, agreeableness, and high reactive control (Martel et al., 2011). In contrast, the specific hyperactivity-impulsivity factor was alternatively associated with rule breaking/aggressive behaviour, social problems, errors during set-shifting, extraversion, disagreeableness, and low reactive control. Martel concluded that the bi-factor model provided a better explanation of heterogeneity within ADHD than the DSM-IV derived ADHD symptom counts or subtypes.

Notwithstanding the accepted persistence of ADHD into adulthood, only a few studies have examined the relevance of a bi-factor model in adult populations. In a recent adult study, Gibbins and colleagues (in press) found the bi-factor model exhibited better fit relative to the 2-factor model. Consistent with findings by Normand et al. (2012) relating to children, Gibbins et al. reported IA symptoms to be closely associated with its specific factor, whereas HI symptoms were more associated with a general factor suggesting some degree of stability in the factor structure over time.

In a further study examining both the structural stability of ADHD across development and within adulthood, Martel, von Eye and Nigg (2012) similarly found a bi-factor model exhibited the best fit in adults and children relative to traditional models, suggesting continuity in the ADHD latent construct across development. However, significant differences in the factor loadings were revealed between children and adults, suggesting changes in the relative importance of particular symptoms over time. Specifically, hyperactivity symptoms were found to decline in importance relative to the ADHD phenotype between childhood and adulthood.

As evidenced by the studies summarised, the bi-factor model is argued to provide an important framework for conceptualising the organisation of ADHD symptoms across both child and adult populations. The model additionally enables the general and specific IA and HI ADHD factors to be examined in relation to other constructs shown to be associated with ADHD, thus enabling additional insight to conceptualisation of the disorder.

One construct empirically shown to be related to ADHD is attachment. Attachment style or organization is a concept derived from John Bowlby's attachment theory and refers to a person's characteristic ways of relating in intimate caregiving and receiving relationships with "attachment figures," often one's parents, children, and romantic partners (Levy, Ellison, Scott, & Bernecker, 2011). Disturbances in early attachment relationships have been implicated in the development of ADHD (Stiefel, 1997), with poorly synchronised and negative parent-child interactions shown to be both related to attachment difficulties and evident in early case histories of children with ADHD (Isabella & Belsky, 1991).

Consistent with existing aetiological models of ADHD emphasising the interaction between genes and environment, attachment is increasingly recognised to be associated with the development of psychopathology (e.g. Clark, Ungerer, Chahoud, Johnson, & Stiefel, 2002). The concept of attachment, as proposed by John Bowlby (1973, 1980, 1982), emphasises the role of quality of early interactions as an early developmental factor in future adjustment. Attachment theory conceptualises "the propensity of human beings to make strong affectional bonds to particular others" (Bowlby, 1977, p. 201) and is argued to provide a useful framework for understanding socio-emotional dysfunction. One of the basic assumptions of Bowlby's attachment theory is that interactions with significant others (attachment figures) are represented in internal working models, providing a prototype for later relationships and influencing adult relationships (Hazan & Shaver, 1987).

It is argued attachment-related working models are reinforced throughout the developmental years and become road maps for perceiving, interpreting, and responding to environments and thus guiding behaviour as children mature into adulthood (see Mickelson, Kessler, & Shaver, 1997). From a developmental pathways perspective, quality of attachment is significant in determining an individual's degree of vulnerability to deviations away from a normal developmental pathway (Bowlby, 1980, 1988a). According to attachment theory, interactions with inconsistent, unreliable, or insensitive attachment figures interfere with the development of a secure, stable mental foundation upon which working models are based. Attachment insecurity can therefore be viewed as a general vulnerability to mental disorders, with the particular symptomatology depending on genetic, developmental, and environmental factors (Mikulincer & Shaver, 2012).

With a growing body of literature demonstrating an association between early attachment and developmental deviations, attachment theory is argued to offer an important perspective in understanding the development of a range of psychological disorders (Sroufe, 1997). The association between attachment and psychopathology is well evidenced in the child and adolescent and adult literature, with studies demonstrating the relationship between attachment and a broad range of psychological disorders including anxiety, personality disturbance and Post Traumatic Stress Disorder (PTSD) (e.g. Shamir-Essakow, Ungerer & Rapee, 2005; Rosenstein & Horowitz, 1996; Mickelson, Kessler & Shaver, 1997 and Allen, Coyne & Huntoon, 1998).

In addition, studies of attachment in both infancy and later childhood have specifically demonstrated externalizing behaviour problems to be related to insecure attachment, particularly disorganized attachment (e.g., Speltz, DeKlyen, & Greenberg, 1999; DeVito & Hopkins, 2001; Hopkins, 2001; Greenberg, Speltz, DeKlyen, & Jones, 2001; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999; Green, Stanley, & Peters, 2007 and Moss, Bureau, Béliveau, Zdebik, & Lépine, 2009). Empirically, attachment security in infancy has also been shown to be predictive of later adjustment (Weinfield, Sroufe, Egeland, & Carlson, 2008). Whilst literature concerning the relationship between attachment and a range of psychopathologies is quite extensive, relatively few studies have specifically investigated the association between attachment and ADHD symptoms, therefore relatively little is known about the relationship.

One study that provides some insight on the attachment ADHD association is a prospective study by Carlson, Jacobvitz and Sroufe (1995) which followed 180 children from birth to the sixth grade. They revealed that among forty different child-related criteria, the risk of ADHD could be singly and accurately predicted by the quality of the parent-child interaction at 6 months, specifically parental intrusiveness and overstimulation, providing strong evidence for the role of early attachment relations in the development of ADHD. Similarly, in a prospective study comparing children with significant levels of disorganised attachment in infancy with controls, Pinto, Turton Hughes, White and Gillberg (2006) found disorganised attachment assessed using the strange situation procedure predicted ADHD at age seven based on teacher ratings (but not ADHD caseness). As noted by Thorell, Rydell and Bohlin (2012), Pinto et al.'s results highlight how assessing constructs as discrete categories (i.e., ADHD versus not ADHD) versus dimensionally (i.e., from low to high symptom levels) may differentially impact results. With reference to ADHD and attachment it has been argued both domains are best regarded dimensionally rather than categorically (e.g., Brennan, Clark & Shaver, 1998; Barkley, 1998 and Lahey et al., 2008).

Further support for the relationship between attachment and ADHD is provided by Clarke et al. (2002) who draw attention to the congruence between the common features evident in children with ADHD and insecurely attached children, namely poor self-regulation, disorganization, impulsiveness, and problematic social relations. In their study comparing 5-10 year old boys diagnosed with ADHD with same-age controls, Clarke et al. reported an association between ADHD and attachment insecurity, with children in the ADHD group scoring higher on measures of insecure attachment. Attachment insecurity was manifested in heightened emotional expression characterised by strong, out of control affects, suggesting an anxious-ambivalent or disorganised attachment style.

Clarke et al. (2002) concluded levels of impulsivity, recklessness, negative attention seeking, hyperactivity and oppositional behaviour could be viewed as strategies to gain the attention of a less than optimally available caregiver. These findings are consistent with those of Green and colleagues (2007), who, in a clinical sample of children with oppositional defiant or conduct disorder, found ADHD symptomatology was both highly prevalent and independently associated with higher levels of disorganized attachment representations. In a more recent study based on a non-clinical sample Thorell et al. (2012) similarly found mental representations of attachment disorganization assessed at age 8½ had a significant effect on ADHD symptoms, independent of both executive functioning and conduct problems.

Both theory and research additionally emphasise the attachment system's contribution to the domain of emotional regulation, deficits in which are central to a diagnosis of ADHD. Sroufe (1997) posits patterns evolved in attachment relationships transfer to the behavioural level, with arousal regulation patterns associated with modulating emotional expression one such skill area which manifests behaviourally.

Attachment theory argues self-regulation skills are modelled by attachment figures (Fonagy & Target, 2002) and acquired in the context of the early parent-child relationship, with the development of self-regulatory capacities contingent on the sensitive responsiveness of the caregiver to infant signals (Cassidy, 1994). This is supported by Nigg (2006) who similarly contends the child's regulatory system (including executive functioning) develops in interaction with a caregiver who can support, scaffold and provide external regulation until the child is able to self-regulate. Given self-regulation is linked to impulse control, perseverance and inhibition, all key features of the ADHD phenotype, the relation between self-regulation and attachment is by extension argued to suggest a further attachment-ADHD association.

This proposition is supported by Stiefel (1997) who argues insecure early caregiver-child interactions and disrupted primary attachments are likely to contribute significantly to the impairment in self-regulation seen in children with ADHD. In support of this view, a review by Cassidy (1994) revealed individuals with insecure attachments are more vulnerable to problems with affective and behavioural regulation, whilst findings by Thompson (1999) suggest secure attachment to a caregiver is related to more effective emotional regulation.

Evidence from children reared in institutions such as Romanian adoptees also provides support for the credible link between attachment disturbance and inattention and overactivity¹, with severe attachment-related problems (e.g., disinhibition) reported across a range of institutionally reared samples using diverse methods (Kreppner, O'Connor, & Rutter, 2001). In a comparison of children adopted following severe early deprivation with controls, Kreppner and colleagues reported a moderate association between attachment problems and inattention-overactivity, even when accounting for IQ.

¹ Note: The term inattention/overactivity (I/O) is used when describing institutionalised samples as symptom presentation in such samples may constitute a different type of inattention and overactivity from that described as ADHD in the DSM-IV (Kreppner, O'Connor & Rutter, 2001).

Similar results were reported by Roy, Rutter and Pickles (2000) based on a different sample of institution-reared children, suggesting that the association between attachment and inattention-overactivity may be more generalised, relevant to populations where children have not been reared in extremely poor quality institutions involving nutritional and psychosocial, deprivation. Whist Kreppner et al. (2001) note the Romanian adoptee pattern of inattention-overactivity found may be atypical of most attention deficit or hyperactivity presentations in terms of the strong association with attachment difficulties, the findings nonetheless align with the argument that a pattern of sensitive, responsive interactions between a child and his/her caregiver are important not only for the development of optimal attachment, but also for the child's ability to self-regulate (Haddad & Garralda, 1992; Schore, 1994; Sroufe, 1996).

Comparable associations between insecure attachment and effective emotional regulation have also been evidenced in adult populations. By middle childhood, the goal of the attachment system shifts from proximity to the attachment figure to availability. Threats to security in older children (and adults) arise from prolonged absence, breakdowns in communication, emotional unavailability or signs of rejection or abandonment (Kobak & Madsen, 2008). Highly anxious adults report worrying that their partners do not love them as much as they love their partners and fearing that their partners will abandon them. In a similar manner as childhood, these working models are thought to play an important role in regulating emotion and behaviour as they enable individuals to predict the motives and actions of others and react accordingly (Collins, 1996; Collins & Read, 1994; Carnelley, Pietromonaco, & Jaffe, 1994).

Consistent with the view that disturbed attachment experiences are related to the occurrence of psychological disorders in adolescents and adults (Bowlby, 1988b; Minde & Benoit, 1991; van IJzendoorn, 1995), the etiological role of disturbed working models of attachment have been implicated in the development of Borderline Personality Disorder (BPD) psychopathology (Fonagy, 1991; Westen, 1991) which, from a phenomenological perspective shares some similarities with ADHD, including deficits in affect regulation and impulse control (Dowson et al., 2004; Hesslinger et al., 2002). In a clinical context Fonagy (1991) argues that affect and impulse regulation derive from the capacity for mental representation of the psychological functioning of self and other, which is argued to closely relate to attachment style.

With self-regulation deficits a core feature of ADHD, the above mentioned results can be taken to support an association between attachment and ADHD symptomatology. With the growth of the attachment literature, the conceptualisation of attachment has similarly expanded beyond child-caregiver relations to incorporate adolescent and adult romantic attachments. The childhood attachment paradigm initially developed by Ainsworth (Ainsworth, Blehar, Waters, & Wall, 1978) identifying three distinct patterns or styles of attachment; secure, avoidant and anxious-resistant (or ambivalent) was extended to adulthood by Hazan and Shaver (1987) who conceptualised romantic love as an attachment process, proposing three analogous adult attachment styles.

Bartholomew (1990) and Bartholomew and Horowitz (1991) revised Hazan and Shaver's three-category classification scheme, proposing a four-category model differentiating between two types of avoidant styles: fearful and dismissing. In an extension of the three-category model developed by Hazen and Shaver (1987), Bartholomew and Bartholomew & Horowitz propose four prototypic forms of adult attachment; *secure*, *preoccupied*, *fearful*, and *dismissing*. The four attachment patterns are defined by combinations of a positive or negative image of the self (e.g. the self is seen worthy of love and support or unworthy) and the positive or negative image of others (e.g. others are seen as trustworthy and available, or as unreliable and rejecting).

In a shift away from categorical approaches, the attachment domains are organised conceptually against two dimensions commonly referred to as *anxious* and *avoidant*. These two factors were verified by a large sample factor analytical study conducted by Brennan and colleagues (1998) which confirmed individual differences in romantic attachment can be organized within a two-dimensional space.

Both anxiety and avoidant dimensions align with Bowlby's theory (Bowlby, 1982) associated with relationship functioning and affect regulation (see Mikulincer & Shaver, 2003; Shaver & Clark, 1994; Shaver & Hazan, 1993, for reviews), with the anxiety dimension corresponding to anxiety and vigilance concerning rejection and abandonment and the avoidant dimension corresponding to discomfort with closeness and dependency or a reluctance to be intimate with others. A diagram of the two dimensional model of attachment is presented in Figure 1.

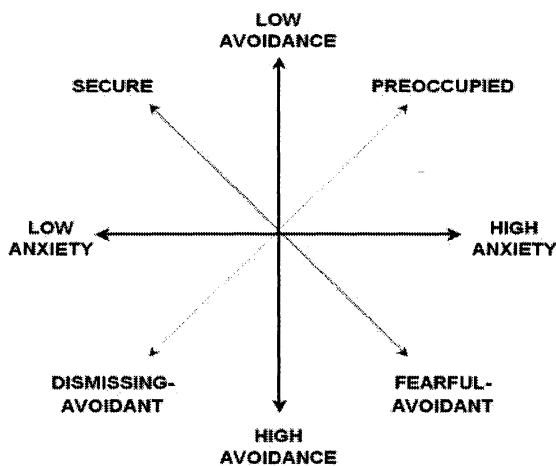


Figure 1. Two dimensional model of individual differences of adult attachment

Two dimensions of anxiety and avoidance underlying self report measures of adult attachment (Brennan, Clark & Shaver, 1998; Fraley & Waller, 1998; Griffin & Bartholomew, 1994).

Within the two-dimensional space, secure attachment is where both anxiety and avoidance are low. As described by Mikulincer, Shaver, and Pereg (2003), this is defined by a sense of attachment security, comfort with closeness and interdependence, and reliance on support seeking and other constructive means of coping with stress. In contrast anxious attachment is where relationship anxiety is high and avoidance is low. Anxious attachment is defined by a lack of attachment security, a strong need for closeness, worries about relationships, and fear of being rejected. An individual who is anxiously attached may employ “hyper activating” strategies to maximize their efforts to maintain relationship attachments, thus becoming hyper-vigilant for threat cues and any signs of rejection (see Mikulincer & Shaver, 2003).

Alternatively avoidant attachment is where avoidance is high, defined by a lack of attachment security, compulsive self-reliance, and preference for emotional distance from others. Rather than hyper activating their attachment systems, individuals who are avoidant may inhibit, suppress or give up on their proximity-seeking efforts rather than risk further rejection, a psychological defence method labelled as a “deactivating” strategy (see Mikulincer & Shaver, 2003).

Hyperactivation and deactivation strategies can be conceptualised as defensive strategies, with each attachment-related strategy having a specific regulatory goal. For insecurely attached individuals these strategies may serve to act as a defensive buffer and therefore are likely to impact on emotional regulation and expression, as well as on cognitive functioning (e.g., Collins, Ford, Guichard & Allard, 2006).

Whilst a series of studies have linked differences in attachment to performance on attachment-related cognitive tasks (e.g., Edelstein, 2006; Edelstein & Gillath, 2007; Fraley, Garner,

& Shaver, 2000; Mikulincer, Dolev, & Shaver, 2004), a handful of studies have also revealed associations between attachment security and areas of executive functioning (including response inhibition and working memory), behaviour inhibition and attention problems; domains similarly implicated in ADHD (e.g. Nigg, 2005, Stefanatos, & Baron, 2007; Willcutt, Pennington, Olson, Chhabildas, & Huslander, 2005).

Illustrating an association between attachment and symptoms characteristic of ADHD, Goldwyn's (2000) study of a normative community sample found disorganised attachment assessed by the Manchester Attachment Story Task (method for assessing attachment representations in children 5-7 years) was correlated with teacher reports of overall behavioural problems, and specifically with high teacher ratings of social problems and attentional problems.

In another study of 8–12 year old children examining the relationship of disorganized attachment to psychopathology symptoms, Borelli, David, Crowley and Mayes (2010) similarly found children with disorganized attachment (based on parent report) had higher symptoms of inattention and thought problems than children classified as having organized attachment. Furthermore, disorganized children were more likely to have clinically significant symptom levels.

In a study examining the executive function component of inhibition and parent–child attachment in relation to general externalizing behaviours, including specific psychopathological symptoms of ADHD, disorganized attachment and poor inhibitory control was found by Bohlin, Eninger, Brocki, and Thorell (2012) to be longitudinally associated with all outcome variables, including ADHD symptoms. Notably insecure attachment, as a broader category of attachment encompassing disorganization together with ambivalence and avoidance was not related to ADHD, suggesting the more specific category of disorganised attachment may be a more accurate precursor of general externalizing problem behaviour (van IJzendoorn, et al., 1999).

Findings by Thorell, Rydell and Bohlin (2012) have similarly implicated attachment security in relation to ADHD symptoms. Combining a neuropsychological perspective with an attachment perspective Thorell et al. additionally examined attachment and ADHD in relation to executive functioning. They also examined the extent to which ADHD symptoms are related to the whole spectrum of insecurity (ambivalent, avoidant, disorganized) or only specifically to attachment disorganization. Executive functioning deficits were found to be significantly related to attachment disorganization, but not to attachment insecurity. Conversely ADHD symptoms were significantly related to executive functioning deficits as well as to both attachment disorganization and attachment insecurity.

Thorell et al. (2012) also found disorganized attachment representations to be related to ADHD symptoms when controlling for the effect of comorbid conduct problems. Whilst in relation to ADHD the interaction effects of executive functioning deficits and attachment representations was not significant, Thorell et al. argue for future research examining the relation between executive functioning and attachment to enable development of a theoretical model conceptualising how these constructs relate to one another and to ADHD.

Further to the evidenced association between ADHD and attachment, some research has additionally suggested attachment security may be more strongly related to specific ADHD symptoms domains. For example, in their longitudinal study Carlson et al. (1995) revealed evidence for the role of early parent-child relations in the development of hyperactivity, which was predicted more powerfully by maternal intrusiveness at 6 months than biological or temperament factors. Generally, however how the ADHD specific symptom domains differentially relate to attachment is untested and thus warrants additional investigation.

In sum, there is strong support in the literature for a theoretical association between attachment and range of neuropsychological, motivational and behavioural processes characteristic of ADHD. Additionally, although scarce, a small number of studies examining attachment security and ADHD symptoms have demonstrated an association between the two constructs. Therefore, although to date the nature of a connection between attachment problems and ADHD in adults has not been carefully examined, theoretical links underpinning such an association, combined with evidence derived from child and adolescent studies suggest an analogous relationship between attachment and ADHD in adults.

The current study

Whilst there is growing support for the bi-factor model, there continues to be a lack of consensus regarding the structural organisation of ADHD. To date, evidence in support of the bi-factor model is limited to a handful of studies and population samples, thus warranting additional investigation. The present study examined the bi-factor model of ADHD in an extension of previous studies. To determine any relative advantage of the bi-factor relative to the 2-factor model, support for both models was investigated along with the associations between attachment with the IA and HI domain factors. These relationships were examined in an adult community sample, with the applicability of the ADHD bi-factor model both in community samples and adult populations largely untested to date.

Notwithstanding a growing interest in the lifespan persistence of ADHD, current knowledge regarding ADHD relies heavily on research with children and adolescents (Retz-Junginger, Roßler Jacob, Alm, & Retz, 2010). Furthermore, despite evidence linking attachment with ADHD, no studies demonstrating an association have directly examined the relationship between the specific HI and IA symptom groups with attachment. As such, the results from this study are expected to contribute to existing ADHD and attachment literature, and in particular increase understanding of the disorder in adults and its interaction with attachment constructs.

The aims of the current study are to (i) investigate support for the bi-factor model of ADHD and (ii) to examine the relationship of anxious and avoidant attachment with IA and HI symptom groups within the 2-factor and the bi-factor models. The criterion variable examined was attachment assessed via self-report ratings utilising the Experience in Close Relationships-Revised Questionnaire (Fraley, Waller, & Brennan, 2000). The questionnaire yields scores on two dimensions of attachment; anxious attachment (anxiety and concerns about being abandoned) and avoidant attachment (unwillingness to depend on attachment figures) (Mikulincer & Shaver, 2007).

Given the scarcity of research examining the relationship between attachment and ADHD, in particular how attachment relates to the specific ADHD symptom domains, combined with increasing empirical support for the bi-factor model, the present study sought to examine the relationship between anxious and avoidant attachment dimensions with the IA and HI specific factors, and general ADHD latent factor scores from the bi-factor model. In line with previous child (Martel et al., 2010; Toplak et al., 2009) and adult studies (Martel et al., 2012; Gibbins et al. in press) it was hypothesised that a bi-factor model would similarly provide the best fit for ADHD symptom ratings in adults. It was further hypothesised that (i) specific inattention would be related to insecure attachment (ii) that specific hyperactivity-impulsivity would be related to insecure attachment (iii) general ADHD symptoms would show more uniform relations to insecure (anxious and avoidant) attachment than secure attachment.

Method

Participants

The sample size for the present study was 326 adults, comprising 237 females (72.7%) and 89 males (27.3%) with an age range of 18-73 years inclusive. Sex was not reported by 0.9% ($n=3$) participants. Age was not reported by 0.6% ($n=2$) participants, both female. Males and females did not differ significantly by age, $t(324) = 0.86$, *ns*; with the mean age of female participants 26.76 years ($SD=10.40$ years) and was 27.91 years ($SD=11.80$ years) for males.

Participants were recruited from two primary geographic areas; the greater Hobart area (Tasmania) and the greater Melbourne area (Victoria). Participants were recruited from the University of Tasmania, School of Psychology first year undergraduate pool and the researcher's own networks including work and university colleagues and associates, sporting clubs, relatives and social networks. Participants recruited through the University undergraduate pool comprised almost half (40.5%) of the sample population. University students received 45 minutes of course credit for participation.

Eligible participants were 18 and over. Participants were not screened for ADHD as an ADHD diagnosis was not a prerequisite for participation in the study. No screening for other psychological disorders was undertaken. Self reported participant ethnicity was coded in accordance with the Australian Bureau of Statistics (ABS) Standard Classification of Cultural and Ethnic Groups (ABS, 2005). The self reported ethnicity of the sample is presented in Table 1, with 13.2% of participants defining their ethnicity as Southern and Eastern European, 26.4% as North West European and the majority, 42.0% as Oceanian.

These figures are consistent with the reported Australian general population distribution whereby 4.3% Southern and Eastern European, 31.6% North West European and 37.1% identify as Oceanian (Australian Bureau of Statistics, ABS, 2010). Chi statistic (with Yates correction) was computed verifying the ethnicity of the current sample is representative of the general Australian population, $\chi^2(8, N=326) = 10.65, p = .22$.

Table 1

Self-Reported Ethnicity as compared to the General Australian Population

Self Reported Ethnicity	Current Sample <i>N</i>	Current Sample %	Australian Population %
Oceanian	137	42.0	37.1
North West European	86	26.4	31.6
Southern and Eastern European	43	13.2	4.3
South-East Asian	3	0.9	0.9
North-East Asian	0	0	3.4
Southern and Central Asian	13	4	1.2
Americas	7	2.1	0.9
Sub-Saharan African	1	0.3	0.4
North African and Middle East	2	0.6	0.9
Not reported	34	10.4	

Note. Ethnicity reported by participants in the current study was coded in accordance with the Australian Bureau of Statistics (ABS) *Standard Classification of Cultural and Ethnic Groups* (ABS, 2005).

Materials

Self report measures were used to assess ADHD, Oppositional Defiant Disorder (ODD) symptomology and level of attachment security. A questionnaire booklet was provided to each participant comprising four measures; (i) the *Adult Temperament Questionnaire – Short Form* (ATQ-SF; Rothbart, Ahadi, & Evans, 2000), (ii) the *Current Symptoms Scale* (CSS; Barkley & Murphy, 1998), (iii) the *Experiences in Close Relationships-Revised Questionnaire* (ECR-R; Fraley, et al., 2000), and (iv) the *BIS/BAS Scale* (Carver & White, 1994) (Appendices A-D). Questionnaires were not identified by name. Note: The BIS/BAS and ATQ measures were not analysed for the purposes of the current study.

A total of six additional demographic items developed by the researchers were included at the beginning of the questionnaire package to assess the demographic profile of the sample (i.e. Participant Age, Gender, Occupation and Ethnic Background; Mother Occupation; Father Occupation).

Current Symptom Scale (CSS)

ADHD ratings were obtained using the *Current Symptom Scale* (CSS; Barkley & Murphy, 1998) consisting of 18 ADHD symptoms and 8 ODD symptoms, correspondent with symptom criteria defined in the DSM-IV-TR. Inattention (IA) includes items like “don’t listen when spoken to directly” and “easily distracted” or “forgetful”. Example items for HI include “fidget with hands or feet”, “feel restless” and “interrupt or intrude on others”. Items representing ODD symptoms include “deliberately annoy people” and “actively defy or refuse to comply with requests or rules”.

Participants indicate how often they experience each symptom over the past 6 months by circling a number from 0 to 3 (0 = “never or rarely”, 1 = “sometimes”, 2 = “often”, and 3 = “very often”). Cronbach’s alpha values have been obtained for the IA and HI symptom groups, .82, and .75, respectively; and .81 for ODD (Gomez, Woodworth, Waugh, & Corr, in press). For the present study the reliability for all 18 ADHD symptom items was .90, whilst reliability for the 9 IA and 9 HI symptom items was .87 and .72 respectively, indicating adequate reliability. Reliability for the 8 ODD symptoms was similarly sufficient at .88.

Experiences in Close Relationship Revised (ECR-R) Questionnaire

The scale contains 36 items, with 18 items for each dimension yielding scores on two subscales; attachment-related anxiety scale (or fear of rejection and abandonment) and attachment-related avoidance scale (or discomfort with closeness and discomfort with depending on others). Participants indicate how they generally experience emotionally intimate relationships through level of agreement with a series randomly presented statements rated on a 7-point scale: 1 = strongly disagree and 7 = strongly agree. Alpha values for the Anxiety items range from 1.24 to 2.79 and from 1.60 to 2.28 on the Avoidance items (Fraley et al., 2000).

For the present study the reliability for all 36 attachment items was .93, whilst the reliability for the 18 anxious attachment and 18 avoidant attachment items was .87 and .94 respectively indicating good reliability.

Procedure

Ethics approval was sought from the University of Tasmania Human Ethics Committee (see Appendix E). Following ethics approval, participants were recruited over a twelve-month period concluding in April 2011. The study was promoted to first year university students by poster advertisements displayed at the Psychology Department at the University of Tasmania Hobart campus. Participants were also invited to take part in the study through informal email and face to face communication.

Each participant in the study received a package comprising a questionnaire booklet, pre paid envelope, Information Sheet (Appendix F) and Debrief Form (Appendix G). The Information Sheet outlined the risks and benefits of participation and advised no diagnosis of ADHD would be made through participation in the study. The Debrief Form thanked participants for their participation. The researchers contact details were included in both forms in the event that participants wished to raise concerns or seek further information about the study.

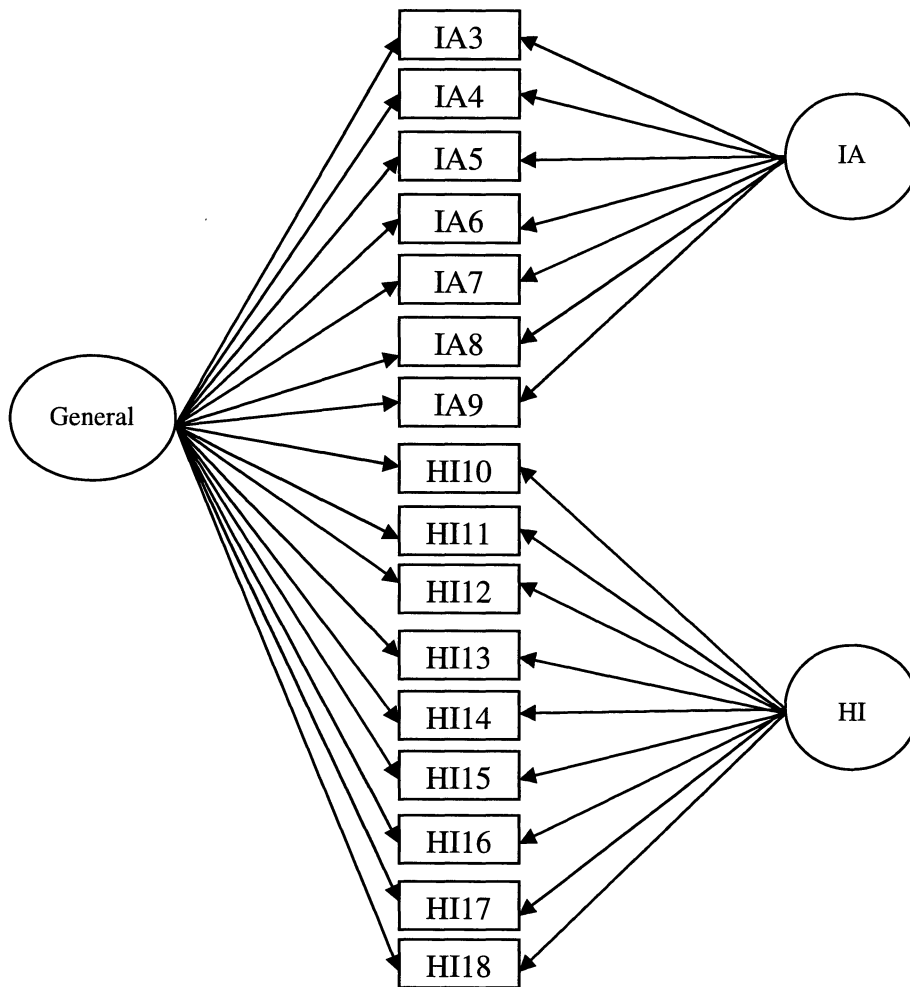
Participation was both voluntary and anonymous, with consent indicated by the return of completed questionnaires. Four hundred and seventy six questionnaires were distributed, 326 questionnaires were returned, at a response rate of 68.5%. Participants were requested to return questionnaires via a return box located at the main office of the School of Psychology or via prepaid envelopes provided.

Data Analysis and Design

Two types of missing values were obtained from the CSS and the ECR-R measures. Respondents either failed to complete items (i.e. left items blank) or circled multiple responses to a single item. Missing values obtained for the CSS and ECR-R scale were defined in SPSS as missing values (-99) and were treated as user-missing values. Missing values obtained for the CSS and ECR-R scale were replaced with expectation-maximisation (EM; via missing values analysis SPSS Version 20).

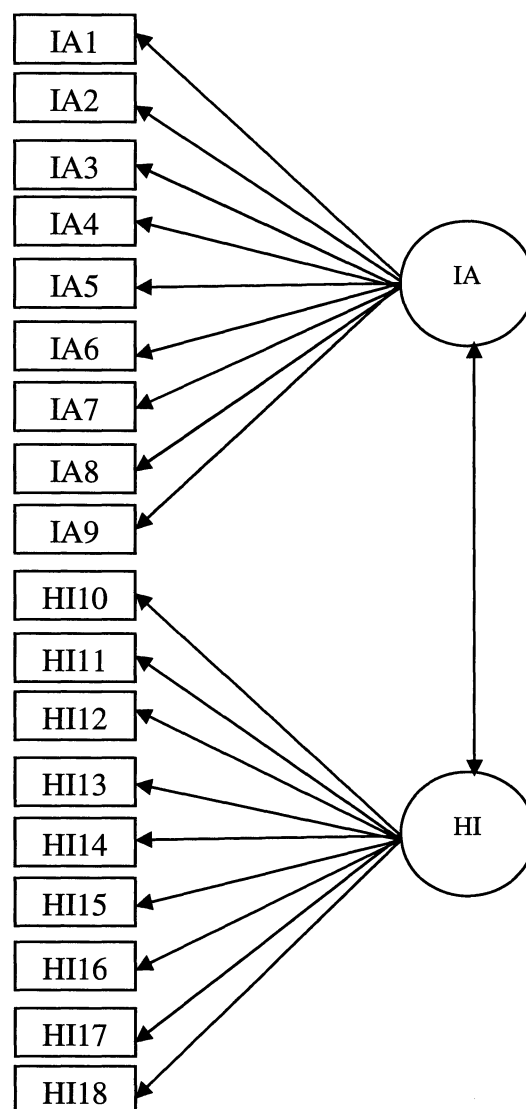
Statistical procedures

Figures 2 and 3 respectively show the path diagram of the bi-factor and 2-factor models tested in the study. Figure 4 shows schematic path diagram of the model used to ascertain the correlations of the bi-factor general and specific factors with two attachment dimensions derived from the ECR-R; anxious and avoidant attachment.



Note. IA = inattention, HI = hyperactivity/impulsivity.

Figure 2. Path diagram of the ADHD bi-factor model.



Note. IA = inattention, HI = hyperactivity/impulsivity.

Figure 3. Path diagram of the ADHD 2-factor correlated model

Results

The goodness-of-fit values for the bi-factor model for were $WLSMV\chi^2 (df = 117) = 209.25, p < .001$; $RMSEA = .055$; and $CFI = .975$. For the 2-factor model, the fit values were $WLSMV\chi^2 (df = 134) = 325.61, p < .001$; $RMSEA = .074$; and $CFI = .948$. These findings indicate good support for the bi-factor model, and mixed support for the 2-factor model. The fit of the bi-factor model was significantly better than the 2-factor model ($\Delta df = 17$); $\Delta WLSMV\chi^2 = 104.82$.

Table 2 shows the factor loadings of the bi-factor and 2-factor models. For the 2-factor model, all symptom loadings were high and significant on the respective IA and HI factors. For the bi-factor model, all symptoms loaded significantly on the general factor with factor loadings ranging from 0.355 to 0.842. Almost all of the symptoms also loaded significantly on the specific IA and HI factors, with the exception of two IA symptoms, ‘listen’ and ‘distracted’, and one of the HI symptoms ‘seat’. Only one of the nine IA symptoms and one of the nine HI symptoms had higher loadings on their specific factor relative to the general factor. The IA symptom with higher loading on its specific factor was “careless”, and the HI symptom with higher loading was ‘talk’.

Table 2

Factor Loadings of the Bi-factor and 2-factor Model

	Bi-factor model			2-factor model	
	General	Specific		Domains	
	ADHD	IA	HI	IA	HI
Careless (IA1)	0.460***	0.606***		0.583***	
Inattention (IA2)	0.725***	0.198*		0.756***	
Listen (IA3)	0.668***	<u>0.058</u>		0.669***	
Instruction (IA4)	0.728***	0.351***		0.798***	
Disorganized (IA5)	0.644***	0.383***		0.722***	
Unmotivated (IA6)	0.726***	0.245**		0.768***	
Lose (IA7)	0.663***	0.391***		0.741***	
Distracted (IA8)	0.842***	<u>0.053</u>		0.833***	
Forgetful (IA9)	0.708***	0.196**		0.739***	
Fidget (HI10)	0.585***		-0.244***		0.556***
Seat (HI11)	0.533***		<u>0.119</u>		0.553***
Run (HI12)	0.795***		-0.189**		0.781***
Quiet (HI13)	0.659***		0.164*		0.685***
Motor (HI14)	0.355***		0.222**		0.390***
Talk (HI15)	0.462***		0.466***		0.539***
Blurt (HI16)	0.570***		0.527***		0.662***
Wait 9 (HI17)	0.641***		0.415***		0.716***
Interrupt (HI18)	0.626***		0.461***		0.701***

Note. All factor loadings, except those underlined, were significant (* $p < .05$, ** $p < .01$, *** $p < .001$).

IA = Inattention; HI = Hyperactivity/Impulsivity

Table 3

Correlations of the factors in the ADHD Models with anxious and avoidant attachment

	Bi-factor model			2-factor model	
	General	Specific		Domains	
	ADHD	IA	HI	IA	HI
Experiences in Close Relationships-Revised Scale (ECR-R)					
Anxious attachment	0.449***	-0.022	0.035	0.407***	0.440***
Avoidant attachment	0.036	-0.030	-0.051	0.021	0.021

Table 3 shows the correlations of the general and specific factors of the bi-factor model and the IA and HI domain factors of the 2-factor model, with anxious and avoidant attachment derived from the ECR-R scores. As shown, both the IA and the HI domain factors of the 2-factor model correlated significantly and positively with anxious attachment.

The general factor in the bi-factor model also correlated significantly and positively with anxious attachment. Neither the IA or HI specific factors had a significant correlation with anxious or avoidant attachment. Avoidant attachment did not correlate significantly with the general and specific factors of the bi-factor model or the 2-factor IA and HI domain factors.

Discussion

The present study sought to establish whether ADHD in an adult community sample is best conceptualised in terms of a 2-factor or bi-factor model of ADHD and examined how the domains of anxious and avoidant attachment relate to IA and HI symptom groups. In line with previous child (Martel et al., 2010; Toplak et al., 2009) and adult studies (Martel et al., 2012; Gibbins et al. in press) it was predicted a bi-factor model would provide the best fit for ADHD adult symptom ratings. The bi-factor model assumes ADHD symptoms share some common variance captured by the general factor and differs from the 2-factor model in that the two symptom domains are assumed to capture variance that is unique from the overarching diagnostic category (Martel et al., 2010).

With regard to the bi-factor model all symptoms were hypothesised to load onto an ADHD general factor, with IA and HI symptoms expected to load onto their respective domain factors. As expected, all symptoms loaded significantly on the general factor, with almost all symptoms also loading significantly on specific IA and HI domain factors, with the exception of ‘listen’, ‘distracted’ (IA symptoms) and ‘seat’ (HI symptom). A significant level of the variance was accounted for by the general factor, with only one IA and one HI symptom loading higher on their specific factor relative to the general factor.

For the 2-factor model strong associations between individual symptoms and the corresponding domain factors were revealed, with all symptoms loading significantly on the respective IA and HI factors. Consistent with previous studies reporting support for the bi-factor model of ADHD (Martel et al., 2010; Toplak et al., 2009; Toplak et al., 2012; Martel et al., 2012; Normand et al, 2012 and Gibbins et al., in press), statistically the bi-factor model provided the best fit to the data, suggesting a model which accounts for both co variation among all symptoms, as well as partially distinct factors, is structurally a more superior model for ADHD.

At a theoretical level, the results are congruent with prior findings from both clinical and community studies which provide support for a single latent construct of ADHD psychopathology underpinning all eighteen DSM-IV ADHD symptoms.

With regard to symptom cluster alignment, the present results differ slightly from Gibbins et al. (in press) where IA symptoms were more closely associated with the IA specific factor, whereas HI symptoms were more associated with a general factor. In the present study most IA and HI symptoms were significantly associated with their specific factor rather than a general factor (i.e. 7 of 9 IA symptoms and 8 of 9 HI symptoms), suggesting after the common variance across all ADHD symptoms had been accounted for, the specific factors captured an additional degree of unique variance in the IA and HI symptom domains.

Whilst support for the bi-factor model of ADHD is also congruent with prior outcomes reported by Martel et al. (2012), the present results deviate in some areas. For example, Martel et al. revealed **all** IA symptoms loaded significantly on the IA specific factor, whereas in the present study two IA symptoms exhibited non-significant loadings. Martel et al. also reported four HI symptoms failed to load significantly on the HI specific factor, whereas in the present study only one HI symptom failed to load significantly on the domain factor. Interestingly the HI symptom 'leaves seat' exhibited non-significant loadings in both studies suggesting this symptom may be less indicative of ADHD in adults.

Whilst the potential developmental decline in importance of some HI symptoms during adulthood has been argued (Hart, Lahey, Loeber, Applegate, & Frick, 1995) and is broadly supported by the findings Martel et al., the present study failed to replicate this result with little difference revealed in symptom loadings on the specific IA and HI factors, and most HI symptoms loading significantly on the HI specific factor. One explanation for this difference is that Martel et al.'s study represented an adult clinical sample as compared to the community sample employed in the present study.

Nonetheless, the present results provide both evidence for the manifestation of the disorder in adulthood and support for conceptualisation of ADHD in terms of general and specific factors within adult populations. This conceptualisation is consistent with the view that whilst symptom presentation persists though the lifespan, symptoms may manifest in terms of a persistent latent general or 'g' ADHD construct, with variance in the specific factorial components that may change over time such as a decreased emphasis on hyperactive versus inattentive symptoms in adulthood (Faraone et al., 2000). As highlighted by Martel et al. (2010) examining longitudinal changes in the structure of ADHD, particularly between childhood and adulthood will provide the opportunity to explore stability and change in terms of general ADHD and its specific factors.

Overall the present findings comprehensively suggest ADHD cannot be simply conceptualised in terms of a latent general factor, but must also be considered in terms of its specific factors. It is argued both the unique variance within symptoms domains, as well as the shared variance between IA and HI symptom clusters is important for understanding the organisation of the disorder. In summary, a bi-factor model which accounts for both co variation among all ADHD symptoms, as well as partially distinct specific factors, is argued to be a structurally a more superior model for the organisation of ADHD in adults. This aligns with the views of Normand and colleagues (2012) who argue it is increasingly evident that factor models of ADHD need to account for both concurrent overlap and separability between ADHD symptom domains. Martel et al. (2012) similarly argue both general ADHD and specific components are important for fully elucidating an individual's symptom presentation in adult (and child) populations. The current study extends existing research in this domain as it is, to our knowledge, only the third study to provide support for the bi-factor model in an adult sample, with previous studies focussing on clinic-referred and community recruited samples of mainly children and adolescents with ADHD.

In other analyses, the current study also examined associations between the general and specific factors of the bi-factor model and the 2-factor model with the criterion variable attachment security. Insecure attachment was conceptualised dimensionally in terms of attachment related anxiety (anxiety and concerns about being abandoned) and attachment related avoidance (unwillingness to depend on attachment figures) (Mikulincer & Shaver, 2007).

In relation to the bi-factor model, neither anxious or avoidant attachment was related to the IA or HI domain factors, whilst anxious attachment was exclusively significantly and positively related to the ADHD latent general factor. No relationship was identified between avoidant attachment and either the domain factors, or the ADHD latent general factor. For the 2-factor model, an association was evidenced between anxious attachment and the specific symptom domains, with both the IA and the HI specific factors correlating significantly and positively with anxious attachment, but failing to correlate with avoidant attachment. Taken together, the bi-factor and 2-factor outcomes suggest it may be the shared variance between the inattentive and hyperactive-impulsive symptom domains, rather than the unique variance, that has the greatest influence on the relationship evidenced between the IA and HI factors and anxious attachment.

The present findings relating attachment with ADHD are congruent with prior studies which have similarly linked level of attachment security with the disorder (Stiefel, 1997). The findings partially support the prediction that general ADHD symptoms would show more uniform relations to insecure attachment, with the results suggesting that anxious attachment, as a dimension of insecure attachment, is more closely related to ADHD than avoidant attachment. Inconsistent with the prediction insecure attachment would show an association with the specific domain factors, the results suggest insecure attachment, specifically anxious attachment, is most predictive of the general ADHD construct representing shared variance between the inattentive and hyperactive-impulsive symptom domains.

This outcome differs from findings by Carlson et al. (1995) whose results suggested maternal intrusiveness at 6 months, interpreted as insecure attachment, was a more powerful predictor of specific hyperactivity. It is however noted the findings by Carlson and colleagues relate to a longitudinal child study and not an adult sample.

The relationship revealed between anxious attachment and the general ADHD factor suggests some common elements and/or pathways may apply to both constructs. A person's position within the two-dimensional conceptual space defined by attachment anxiety and avoidance is proposed by Mikulincer and Shaver (2007) to reflect their sense of attachment security and the way in which they deal with threats and distress. Individuals who suffer from relationship insecurity (anxious or avoidant) are argued to employ secondary attachment strategies, either deactivating or hyper-activating their attachment system in an effort to cope with threats (Cassidy and Kobak, 1998).

Anxiously attached individuals rely on hyper-activating strategies that consist of energetic attempts to achieve proximity, support, and love, combined with lack of confidence that these resources will be provided and resentment and anger when they are not provided (Cassidy & Kobak, 1998). The activation of such strategies is typical in relationships where an attachment figure is unreliably responsive, resulting in persistent proximity-seeking attempts being rewarded under a partial reinforcement schedule.

Attachment anxiety has also been associated with socially destructive outbursts of anger and impulsive, demanding behaviour toward relationship partners, sometimes including violence (Mikulincer & Shaver, 2007.). Such insecure patterns of relating fail to provide the necessary context for developing effective emotional regulation strategies, instead further reinforcing secondary attachment strategies (i.e. attachment system hyper-activation and de-activation), with people who score high on attachment anxiety often interpreting negative emotions to be congruent with their attachment system hyper-activation (Mikulincer & Shaver, 2012.).

Consistent with prior studies demonstrating an association between attachment security and ADHD symptoms (e.g. Clark et al., 2002; Green et al., 2007; Bohlin et al., 2012 and Thorell et al., 2012), overall the pattern of results observed in the present study support the notion that interactions with available attachment figures and the ensuing attachment security provide actual and symbolic supports for learning constructive emotion-regulation strategies (Cassidy, 1994). It is therefore argued emotion-regulation deficits regularly observed in ADHD may be influenced by insecure attachment relations that fail to provide the context for developing self-regulatory skills. It is noted however that attachment security reported in the present study represents how the participant ‘generally experiences relationships’ and therefore does not necessarily reflect the nature of early attachment relationships. Nonetheless, stability in attachment interactions from child to adulthood is well documented and is argued to be grounded in early attachment relationship experiences and working models (Hazan & Shaver, 1987).

The present findings add evidence to empirical studies which argue the bi-factor model of ADHD provides an important framework for conceptualising the organisation of ADHD symptoms across populations. This study, together with evidence from clinical child samples and child and adult community samples suggest the bi-factor model is relevant for both children and adults across clinical and community settings. The current study additionally revealed insecure attachment, specifically anxious attachment, is predictive of the common variance between the hyperactive and inattentive ADHD symptom domains, consistent with prior research evidencing an ADHD-attachment association.

The current findings should however be interpreted in light of several limitations. Firstly, the present study tests the bi-factor model of ADHD in a community-recruited adult sample therefore generalisability of the model to child, adolescent and clinical populations may be limited. Whilst examining the model in an adult population extends existing research, further validation across a broader range of adult samples is required, including clinical and general populations.

Further validation of the model in child studies has similarly been called for by other researchers (e.g. Normand et al., 2012). In light of recent support for the bi-factor model in child and adult populations Martel et al. (2010) argues further examination of longitudinal changes in the structure of ADHD should be explored, particularly between childhood and adulthood. In line with broad recognition that the symptoms of ADHD wax and wane across development (Lahey et al., 2005), the bi-factor model may offer a useful framework for exploring differential stability and change in ADHD.

A second limitation is that comorbid pathologies such as ODD were not accounted for in the present study. Given 65–89% of all adults with ADHD suffer from one or more psychiatric disorder during their lifetime (Sobanski, 2006) it is recommended further analyses on the relation between attachment and ADHD be conducted whilst controlling for the possible contributions of different types of psychopathologies, preferably using dimensional measures in order to account for subclinical levels of potential comorbid problems (Thorrel, 2012), particularly externalising problems given their overlap with ADHD (Pliszka, 1998). The extent to which the present findings may differentially apply across gender groups should also be addressed in future studies.

It is also noted the present study relied on self-report measures of both ADHD and attachment, with the attachment measure focused on relational feelings and behaviors, relying on a degree of relationship insight and accurate reporting. Whilst the selected measures boast strong validity and reliability, potential limits to self report should be recognised.

Finally, the present study design does not allow for causal inferences regarding the role of insecure attachment patterns in the development of ADHD, particularly as the attachment-psychopathology link is widely accepted to be moderated by a large array of biological, psychological, and socio-cultural factors (Mulkiner & Shaver, 2012). Rather, the results of this study build on current knowledge pertaining to the association between adult attachment patterns and ADHD symptomatology. Additionally the current study highlights the benefits and the empirical usefulness of the dimensional approach to clinical phenomena.

The latent structure of ADHD examined in the present study additionally has important research and clinical implications. Conceptualisation of ADHD in terms of a bi-factor model suggests that individuals with ADHD are a heterogeneous group that can arrive at ADHD diagnosis in different ways. Attention Deficit Hyperactivity Disorder thus seems to represent an overarching diagnostic category characterised by partially distinct pathways via inattention and hyperactivity-impulsivity, consistent with recent theoretical conceptualisations of the disorder offered by Nigg (2006) and Sonuga-Barke (2005). As such, as noted by Martel et al. (2012) comprehensive assessment of specific inattention, specific hyperactivity-impulsivity, and general ADHD symptoms should be emphasised in clinical assessment due to potentially distinct implications for treatment.

Future research pertaining to attachment security and insecurity, including further examination of the connections between insecure attachment and psychopathology will continue to provide valuable insights in relation to vulnerability to pathologies, the development of psychopathology and opportunities for interventions. Given the notable absence of research addressing the relationship between attachment and ADHD, combined with the emerging evidence for the bi-factor model, future studies examining the attachment-ADHD association should distinguish the ADHD general factor from the specific domain factors and delineate the anxious and avoidant dimensions of attachment in order to reveal in more detail the nature of the interrelations.

In conclusion, the present study both extends existing literature linking attachment processes to the development of psychopathology, whilst also providing evidence in support of a bi-factor model of ADHD. Together with existing research, the current findings emphasise the relevance of examining attachment not only to improve understanding regarding the aetiology and conceptualisation of a range of disorders, including ADHD, but also in order to inform the development of interventions which address relationship security as a means of improving psychological functioning.

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Appendix A: Adult Temperament Questionnaire (ATQ-SF; Rothbart, Ahadi, & Evans, 2000)

Appendix B: Current Symptoms Scale (CSS; Barkley & Murphy, 1998)

Appendix C: Experiences in Close Relationships-Revised Questionnaire (ECR-R; Fraley, Waller, & Brennan, 2000)

Appendix D: BIS/BAS Scale (Carver & White, 1994)

Appendix E: Ethics Approval - University of Tasmania Human Ethics Committee

Appendix F: Information Sheet

Appendix G: Debrief Form

Appendix A

Adult Temperament Questionnaire (ATQ-SF; Rothbart, Ahadi, & Evans, 2000)

Instructions: Circle the appropriate number below to indicate how well a given statement describes you.

1	2	3	4	5	6	7	X
extremely untrue	quite untrue	slightly untrue	neither true nor false	slightly true	quite true	extremely true	not applicable

1. I become easily frightened.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

2. I am often late for appointments.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

3. Sometimes minor events cause me to feel intense happiness.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

4. I find loud noises to be very irritating.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

5. It's often hard for me to alternate between two different tasks.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

6. I rarely become annoyed when I have to wait in a slow moving line.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

7. I would not enjoy the sensation of listening to loud music with a laser light show.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

8. I often make plans that I do not follow through with.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

9. I rarely feel sad after saying goodbye to friends or relatives.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

10. Barely noticeable visual details rarely catch my attention.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

11. Even when I feel energized, I can usually sit still without much trouble if it's necessary.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

12. Looking down at the ground from an extremely high place would make me feel uneasy.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

13. When I am listening to music, I am usually aware of subtle emotional tones.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

14. I would not enjoy a job that involves socializing with the public.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

15. I can keep performing a task even when I would rather not do it.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

16. I sometimes seem to be unable to feel pleasure from events and activities that I should enjoy.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

17. I find it very annoying when a store does not stock an item that I wish to buy.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

18. I tend to notice emotional aspects of paintings and pictures.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

19. I usually like to talk a lot.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

20. I seldom become sad when I watch a sad movie.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

21. I'm often aware of the sounds of birds in my vicinity.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

22. When I am enclosed in small places such as an elevator, I feel uneasy.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

23. When listening to music, I usually like turn up the volume more than other people.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

24. I sometimes seem to understand things intuitively.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

25. Sometimes minor events cause me to feel intense sadness.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

26. It is easy for me to hold back my laughter in a situation when laughter wouldn't be appropriate.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

27. I can make myself work on a difficult task even when I don't feel like trying.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

28. I rarely ever have days where I don't at least experience brief moments of intense happiness.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

29. When I am trying to focus my attention, I am easily distracted.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

30. I would probably enjoy playing a challenging and fast paced video-game that makes lots of noise and has lots of flashing, bright lights.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

31. Whenever I have to sit and wait for something (e.g., a waiting room), I become agitated.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

32. I'm often bothered by light that is too bright.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

33. I rarely notice the color of people's eyes.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

34. I seldom become sad when I hear of an unhappy event.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

35. When interrupted or distracted, I usually can easily shift my attention back to whatever I was doing before.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

36. I find certain scratchy sounds very irritating.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

37. I like conversations that include several people.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

38. I am usually a patient person.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

39. When I am resting with my eyes closed, I sometimes see visual images.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

40. It is very hard for me to focus my attention when I am distressed.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

41. Sometimes my mind is full of a diverse array of loosely connected thoughts and images.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

42. Very bright colors sometimes bother me.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

43. I can easily resist talking out of turn, even when I'm excited and want to express an idea.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

44. I would probably not enjoy a fast, wild carnival ride.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

45. I sometimes feel sad for longer than an hour.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

46. I rarely enjoy socializing with large groups of people.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

47. If I think of something that needs to be done, I usually get right to work on it.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

48. It doesn't take very much to make feel frustrated or irritated.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

49. It doesn't take much to evoke a happy response in me.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

50. When I am happy and excited about an upcoming event, I have a hard time focusing my attention on tasks that require concentration.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

51. Sometimes, I feel a sense of panic or terror for no apparent reason.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

52. I often notice mild odours and fragrances.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

53. I often have trouble resisting my cravings for food drink, etc.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

54. Colorful flashing lights bother me.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

55. I usually finish doing things before they are actually due (for example, paying bills, finishing homework, etc.).

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

56. I often feel sad.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

57. I am often aware how the colour and lighting of a room affects my mood.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

58. I usually remain calm without getting frustrated when things are not going smoothly for me.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

59. Loud music is unpleasant to me.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

60. When I'm excited about something, it's usually hard for me to resist jumping right into it before I've considered the possible consequences.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

61. Loud noises sometimes scare me.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

62. I sometimes dream of vivid, detailed settings that are unlike anything that I have experienced when awake.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

63. When I see an attractive item in a store, it's usually very hard for me to resist buying it.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

64. I would enjoy watching a laser show with lots of bright, colourful flashing lights.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

65. When I hear of an unhappy event, I immediately feel sad.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

66. When I watch a movie, I usually don't notice how the setting is used to convey the mood of the characters.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

67. I usually like to spend my free time with people.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

68. It does not frighten me if I think that I am alone and suddenly discover someone close by.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

69. I am often consciously aware of how the weather seems to affect my mood.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

70. It takes a lot to make me feel truly happy.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

71. I am rarely aware of the texture of things that I hold.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

72. When I am afraid of how a situation might turn out, I usually avoid dealing with it.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

73. I especially enjoy conversations where I am able to say things without thinking first.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

74. Without applying effort, creative ideas sometimes present themselves to me.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

75. When I try something new, I am rarely concerned about the possibility of failing.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

76. It is easy for me to inhibit fun behavior that would be inappropriate.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

77. I would not enjoy the feeling that comes from yelling as loud as I can.

1	2	3	4	5	6	7	X
---	---	---	---	---	---	---	---

Appendix B

Current Symptoms Scale (CSS; Barkley & Murphy, 1998)

Instructions: Please circle the number next to each item that best describes your behaviour during the past 6 months.

	<i>Never or Rarely</i>	<i>Sometimes</i>	<i>Often</i>	<i>Very Often</i>
Fail to give close attention to details or make careless mistakes in my work	0	1	2	3
Fidget with hands or feet and squirm in seat	0	1	2	3
Have difficulty in sustaining my attention in tasks or fun activities	0	1	2	3
Leave my seat in situations in which seating is expected	0	1	2	3
Don't listen when spoken to directly.	0	1	2	3
Feel restless	0	1	2	3
Don't follow through on instructions and fail to finish work	0	1	2	3
Have difficulty engaging in leisure activities or doing fun things quietly	0	1	2	3
Have difficulty in organising tasks or activities	0	1	2	3
Feel "on the go" or "driven by a motor"	0	1	2	3
Avoid, dislike, or am reluctant to engage in work that requires sustained mental effort	0	1	2	3
Talk excessively	0	1	2	3
Loose things necessary for tasks and activities	0	1	2	3
Blurt out answers before questions have been completed.	0	1	2	3
Am easily distracted	0	1	2	3
Have difficulty awaiting turn	0	1	2	3
Am forgetful in daily activities	0	1	2	3
Interrupt or intrude on others	0	1	2	3
Lose temper	0	1	2	3
Argue	0	1	2	3
Actively defy or refuse to comply with requests or rules	0	1	2	3
Deliberately annoy people	0	1	2	3
Blame others for my mistakes or misbehavior	0	1	2	3
Am touchy or easily annoyed by others	0	1	2	3
Am angry or resentful	0	1	2	3
Am spiteful or vindictive	0	1	2	3

Appendix C

Experiences in Close Relationships-Revised Questionnaire (ECR-R; Fraley, Waller, & Brennan, 2000)

Instructions: The statements below concern how you feel in emotionally intimate relationships. We are interested in how you *generally* experience relationships, not just in what is happening in a current relationship. Respond to each statement by circling a number to indicate how much you agree or disagree with the statement

	<i>Strongly Disagree</i>					<i>Strongly Agree</i>	
It helps to turn to my romantic partner in times of need.	1	2	3	4	5	6	7
I often wish that my partner's feelings for me were as strong as my feelings for him or her.	1	2	3	4	5	6	7
I find it difficult to allow myself to depend on romantic partners.	1	2	3	4	5	6	7
I do not often worry about being abandoned.	1	2	3	4	5	6	7
I find that my partner(s) don't want to get as close as I would like.	1	2	3	4	5	6	7
I often worry that my partner will not want to stay with me.	1	2	3	4	5	6	7
I find it relatively easy to get close to my partner.	1	2	3	4	5	6	7
I often worry that my partner doesn't really love me.	1	2	3	4	5	6	7
My romantic partner makes me doubt myself.	1	2	3	4	5	6	7
I'm afraid that I will lose my partner's love.	1	2	3	4	5	6	7
When my partner is out of sight, I worry that he or she might become interested in someone else.	1	2	3	4	5	6	7
I worry that romantic partners won't care about me as much as I care about them.	1	2	3	4	5	6	7
I am very comfortable being close to romantic partners.	1	2	3	4	5	6	7
My partner only seems to notice me when I'm angry.	1	2	3	4	5	6	7
It makes me mad that I don't get the affection and support I need from my partner.	1	2	3	4	5	6	7
I prefer not to show a partner how I feel deep down.	1	2	3	4	5	6	7
I don't feel comfortable opening up to romantic partners.	1	2	3	4	5	6	7
I get uncomfortable when a romantic partner wants to be very close.	1	2	3	4	5	6	7
I worry a lot about my relationships	1	2	3	4	5	6	7
I prefer not to be too close to romantic partners.	1	2	3	4	5	6	7
My desire to be very close sometimes scares people away.	1	2	3	4	5	6	7
Sometimes romantic partners change their feelings about me for no apparent reason.	1	2	3	4	5	6	7
I'm afraid that once a romantic partner gets to know me, he or she won't like who I really am.	1	2	3	4	5	6	7
When I show my feelings for romantic partners, I'm afraid they will not feel the same about me.	1	2	3	4	5	6	7
I feel comfortable sharing my private thoughts and feelings with my partner.	1	2	3	4	5	6	7
I rarely worry about my partner leaving me.	1	2	3	4	5	6	7
I usually discuss my problems and concerns with my partner.	1	2	3	4	5	6	7
My partner really understands me and my needs.	1	2	3	4	5	6	7
I am nervous when partners get too close to me.	1	2	3	4	5	6	7
It's easy for me to be affectionate with my partner.	1	2	3	4	5	6	7
It's not difficult for me to get close to my partner.	1	2	3	4	5	6	7
I worry that I won't measure up to other people.	1	2	3	4	5	6	7
I find it easy to depend on romantic partners.	1	2	3	4	5	6	7
I talk things over with my partner.	1	2	3	4	5	6	7
I tell my partner just about everything.	1	2	3	4	5	6	7
I feel comfortable depending on romantic partners.	1	2	3	4	5	6	7

Appendix D

BIS/BAS Scale (Carver & White, 1994)

Instructions: Please circle the number next to each item that best describes your behaviour during the past 6 months

The following are some statements relating to your personality. Please indicate the extent to which you agree or disagree with each statement by circling the appropriate number.

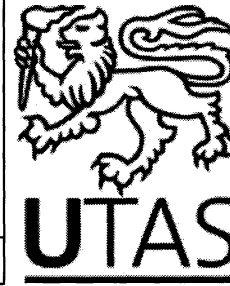
	Strongly Disagree	Disagree	Agree	Strongly Agree
1. If I think something unpleasant is going to happen, I usually get pretty worked up.	1	2	3	4
2. I worry about making mistakes.	1	2	3	4
3. Criticism or scolding hurts me quite a bit.	1	2	3	4
4. I feel pretty worried or upset when I think or know somebody is angry at me.	1	2	3	4
5. Even if something bad is about to happen to me, I rarely experience fear or nervousness.	1	2	3	4
6. I feel worried when I think I have done poorly at something.	1	2	3	4
7. I have very few fears compared to my friends.	1	2	3	4
8. When I get something I want, I feel excited and energised.	1	2	3	4
9. When I'm doing well at something, I love to keep at it.	1	2	3	4
10. When good things happen to me, it affects me strongly.	1	2	3	4
11. It would excite me to win a contest.	1	2	3	4
12. When I see an opportunity for something I like, I get excited right away.	1	2	3	4
13. When I want something, I usually go all out to get it.	1	2	3	4
14. I go out of my way to get things I want.	1	2	3	4
15. If I see a chance to get something I want, I move on it right away.	1	2	3	4
16. When I go after something, I use a 'no holds barred' approach.	1	2	3	4
17. I will often do things for no other reason than that they might be fun.	1	2	3	4
18. I crave excitement and new sensations.	1	2	3	4
19. I'm always willing to try something new if I think it will be fun.	1	2	3	4
20. I often act on the spur of the moment.	1	2	3	4

Appendix E

Ethics Approval University of Tasmania Human Ethics Committee

MEMORANDUM

Social Science Ethics Officer
Private Bag 01 Hobart
Tasmania 7001 Australia
Tel: (03) 6226 2764
Fax: (03) 6226 7148
Marilyn.Knott@utas.edu.au



HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK

MINIMAL RISK ETHICS APPLICATION APPROVAL

05 May 2010

Professor Rapson Gomez
Psychology
Private Bag 30
Hobart

Ethics Reference: H11105

The relationship between ADHD characteristics and personality in a community sample.

Dear Professor Gomez

Acting on a mandate from the Tasmania Social Sciences HREC, the Chair of the committee considered and approved the above project on 02 May 2010.

Please note that this approval is for four years and is conditional upon receipt of an annual Progress Report. Ethics approval for this project will lapse if a Progress Report is not submitted.

The following conditions apply to this approval. Failure to abide by these conditions may result in suspension or discontinuation of approval.

1. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval, to ensure the project is conducted as approved by the Ethics Committee, and to notify the Committee if any investigators are added to, or cease involvement with, the project.
2. Complaints: If any complaints are received or ethical issues arise during the course of the project, investigators should advise the Executive Officer of the Ethics Committee on 03 6226 7479 or human.ethics@utas.edu.au.
3. Incidents or adverse effects: Investigators should notify the Ethics Committee immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.

4. Amendments to Project: Modifications to the project must not proceed until approval is obtained from the Ethics Committee. Please submit an Amendment Form (available on our website) to notify the Ethics Committee of the proposed modifications.
5. Annual Report: Continued approval for this project is dependent on the submission of a Progress Report by the anniversary date of your approval. You will be sent a courtesy reminder closer to this date. **Failure to submit a Progress Report will mean that ethics approval for this project will lapse.**
6. Final Report: A Final Report and a copy of any published material arising from the project, either in full or abstract, must be provided at the end of the project.

Yours sincerely

Ethics Executive Officer

Appendix F
Information Sheet



UNIVERSITY
OF TASMANIA

PARTICIPANT INFORMATION SHEET
SOCIAL SCIENCE/ HUMANITIES
RESEARCH
April 2010

The relationship between ADHD and personality in a community sample

Invitation

You are invited to participate in a research study that is looking at the relation between attention deficit hyperactivity disorder (ADHD) and personality in adults.

The study is being conducted by:

Principal Researcher: Prof. Rapson Gomez, Professor in Clinical Psychology, Director of Clinical Training at the School of Psychology

Student Researchers:

- (1). Elaine Devlin, Clinical MPsych Psychology Student
Email: edevlin@utas.edu.au
- (2). Chantelle Kyriakides, BA (Hons) Psychology Student
Email: mareek0@utas.edu.au

Dear Potential Participant,

Our names are Elaine Devlin and Chantelle Kyriakides and we are each respectively undertaking a Clinical Masters, and Honours Degree in Psychology at the University of Tasmania. As part of this degree programme we are conducting research under the supervision of Professor Rapson Gomez. We would like to invite you to participate in a research study into attention deficit hyperactivity disorder (ADHD) in adults. This study will investigate relationships between behaviours associated with attention deficit hyperactivity disorder (ADHD), personality traits and attachment.

1. 'What is the purpose of this study?'

The purpose is to investigate relationships between behaviors' associated with attention deficit hyperactivity disorder (ADHD), personality and attachment (or how people generally experience close relationships).

2. 'Why have I been invited to participate in this study?'

You are eligible to participate in this study as this research is focused on investigating behaviors associated with ADHD in adults within the general population. Participation is completely voluntary. There is no requirement to have been diagnosed, or assessed for ADHD in order to participate in this study.

This study does not involve diagnosing ADHD and the measures used will not be able to provide a diagnosis.

4. 'What does this study involve?'

Participation in this study involves completing a series of self report questionnaires measuring levels of ADHD behaviours, attachment (or relationship) security and different aspects of personality.

Time estimated to complete the questionnaires is approximately 30 minutes. You are free to complete the questionnaires at a time and place suitable to you. Questionnaires can either be personally handed back to the researchers, or by post using the reply-paid envelope provided. First year students are asked to return completed questionnaires to the researchers or Sue Jopling's office at the School of Psychology to allow participation credit to be awarded.

It is important that you understand that your involvement in this study is voluntary. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate. You may also discontinue participation at any time, without providing an explanation. Your consent to participate is implied by your completion and submission of the questionnaire.

As this research is anonymous, you will not be required to reveal your name. As such, information gathered from questionnaires cannot be personally identified. All data will be kept in a locked cabinet at the School of Psychology at the University of Tasmania. Data will be kept for a period of at least five years from the date of publication and then shredded.

5. Are there any possible benefits from participation in this study?

Whilst participation will not provide any direct benefits to participants, broader benefits are anticipated for the wider community. It is hoped results from this study will contribute to existing ADHD and personality literature, and in particular increase current understanding of the disorder in adults.

First Year Psychology students will be awarded credit for participating in the study. Students will need to request participation credit when returning completed questionnaires either to Ms Sue Jopling at the School of Psychology, University of Tasmania, or directly to the researchers Chantelle Kyriakides, and Elaine Devlin. Credit is awarded for 30 minutes of research participation.

6. Are there any possible risks from participation in this study?

There are no specific risks anticipated with participation in this study. However, if you find that you are becoming distressed or experience discomfort you will be advised to receive support from an external organization such as Lifeline (Ph: 131 114) or Relationships Australia (Ph: 03 6211 4050).

7. What if I have questions about this research?

If you would like to discuss any aspect of this study please feel free to contact Professor Rapson Gomez ph (03) 62262887 who would be happy to discuss the research with you.

This study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote [H11105].

Thank you for taking the time to consider participating in this study.

Please note your consent to participate will be implied through completion and submission of the questionnaire.

This information sheet is for you to keep.

Appendix G

Debrief Form



Debriefing Statement:

Thank you for your participation in this study.

As outlined in the *Information Sheet* at the beginning of this package, this study is focused on investigating relationships between levels of ADHD behaviours, attachment (or relationship) security and aspects of personality.

The first questionnaire you completed assesses how often you engage in a range of behaviours associated with ADHD such as inattentiveness, hyperactivity and impulsiveness. If you indicated you experience some of these behaviours it does not necessarily mean that you have ADHD.

Other parts of the questionnaire relate to personality and temperament characteristics, and how you feel in emotionally intimate relationships including how you generally experience these relationships.

If, following completion of the questionnaires you experience distress or discomfort, the researchers are available for informal debriefing support. Elaine Devlin can be reached via e-mail at edevlin@utas.edu.au as well as Chantelle Kyriakides, mareek0@utas.edu.au.

Further support is also available by contacting external organisations such as Lifeline (Ph: 131 114) or Relationships Australia (Ph: 03 6211 4050).

The first phase of this study will be completed by October 2010, with further results expected by October 2011.

If you wish to obtain further information about the research, questionnaires, or outcomes of the study please contact the principal researcher Professor Rapson Gomez at Rapson.Gomez@utas.edu.au or alternatively, (03) 6226-2887.